AVICULTURAL MAGAZINE

VOLUME 123
No. 1
2017

THE AVICULTURAL SOCIETY

The Avicultural Society was founded in 1894 for the study of British and foreign birds in the wild and in captivity. The Society is international in character, having members throughout the world.

Membership subscription rates per annum for 2016: British Isles £21.00: Overseas £24.00 (plus £6.00 for airmail). (UK funds please). Full-time students £12.00, Overseas £15.00 (please state course attended). The subscription is due on **1st January of each year** and those joining the Society later in the year will receive back numbers of the current volume of the AVICULTURAL MAGAZINE.

KATE ATWELL, SECRETARY-TREASURER, THE AVICULTURAL SOCIETY,
8 CHELSFIELD, BACKWELL, NORTH SOMERSET, BS48 3LU, UK.

Subscriptions can be made by Paypal at www.avisoc.co.uk, by cheque, or directly to The Avicultural Society Account, Barclays Bank, Southminster Branch. Please quote Account No. 13296954, Sort Code 20 54 30, and ensure you send your name as the account reference, or else we cannot match payments. In case of difficulty please contact the Treasurer at the address above, or email kateatwell@googlemail.com.

Website: **http://www.avisoc.co.uk**

The AVICULTURAL MAGAZINE welcomes articles and news items from both members and non-members (no payment is made). These can be about any aspect of aviculture, conservation or natural history concerning non-domesticated bird species that are likely to be of interest to aviculturists. Articles submitted for publication should preferably not have been published elsewhere and should ideally be written in English, although translation is possible. Scientific as well as vernacular bird names should be given, and references cited in the text should be listed at the end of the article. Material can be sent as an email attachment to editor@avisoc.co.uk and can be accepted in most common file formats. Files on disk and typed or handwritten manuscripts are also accepted. Line drawings, black and white or colour photographs can be used to illustrate articles and should be clearly captioned. Tables and graphs submitted will be used whenever possible. Graphs should ideally be accompanied by the relevant source data. Please notify the editor if you do not wish your email address to accompany your article.

ADDRESS OF THE EDITOR:

MARTIN GREENE, THE AVICULTURAL MAGAZINE, VALE COTTAGE, HEMINGTON, RADSTOCK, SOMERSET, BA3 5XU, UK. Email editor@avisoc.co.uk.

Cover Picture: Male Ribbon-tailed Bird-of-Paradise by Cyril Laubscher.

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

Vol. 123 - No. 1 ISSN 0005 2256 2017

The Avicultural Society

FOR THE STUDY OF BRITISH AND FOREIGN BIRDS
IN THE WILD AND CAPTIVITY

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

Vol. 123 - No. 1 ISSN 0005 2256 2017

FROM THE CHAIRMAN

It was very encouraging to see so many members at the recent AGM. The weekend was organised on a similar pattern to last year's successful meeting. My thanks to Chris Kent for organising, to our excellent speakers Logan Ody and Neil Forbes, and to our hosts at Cotswold Wildlife Park for their help and hospitality.

To review the Society's year since the 2016 AGM:

We also held a Summer party at Birdworld in June. Attendance was lower than at our first party there in 2014, but those present enjoyed a sociable and interesting afternoon, and we are very grateful to Duncan Bolton and his staff for their hospitality. Our next meeting was the Autumn social weekend in September, which included visits to Bristol Zoo Gardens and Wild Place on Saturday and the International Centre for Birds of Prey at Newent on Sunday. The successful organisation of this weekend, despite our visit to Bristol coinciding with the arrival of the cycling Tour of Britain and the consequent closure of most roads around the zoo, was thanks to the work put in by Chris Kent and Kate Atwell.

Also in September, a group of 22 members and guests enjoyed a trip to Ireland, visiting a number of public and private collections in Northern Ireland and the Irish Republic, where the warmth of the welcome was matched by the excellence of the collections. A full report will appear in the next magazine.

We also attended the Parrot Society's 50th anniversary seminar at Chester Zoo in September; thanks to Graham Thurlow who manned our stand single-handed, and also to Paul Convy, who did the same at the National show and sale at Stafford in October. Fortunately we had more help available at the Stafford Spring Show earlier this month. Following painstaking research by Allan Brooker and Geoff Masson over quite a long period, we at last have a stock of medals to award. Our original stocks had run out, and we had experienced some difficulty in finding a new supplier, but after a number of false starts Geoff eventually located a company who have produced an excellent reproduction of the original medal, and we have already awarded the first. A few days before the AGM, The President's Medal was presented to Dr Henri Quinque for a

lifetime's achievement in aviculture, including at least three world-first breedings, the establishment of the only sustainable captive colony of Kagu, and sustained breedings of a number of rare and difficult species.The President's Medal is only awarded under exceptional circumstances, and this is the first such award for some decades. We will publish more details of Dr Quinque's award, and of revisions to the Society's award scheme which I was able to announce at the AGM, in the next issue.

Another great achievement this year was the publication of all four 2016 issues of the Avicultural Magazine in the correct calendar year. Thanks to editor Martin Greene for his hard work. Martin indicated his wish to stand down as editor almost a year ago, but has continued to work on the magazine until we find his successor. We think we have found a suitable willing candidate, and hope to be able to confirm that in the near future. Martin has kindly agreed to support the prospective editor until he is ready to take over independently.

The Raymond Sawyer Scholarship for 2016 was awarded to Logan Ody. Logan is a softbill keeper at Paradise Park in Cornwall, and also has his own bird collection. He attended a specialist incubation course at the Durrell Academy in Jersey in November. Their involvement with the Society has also been instrumental in helping Rosemary Drew, who won the scholarship in 2015, and Jodie Clements, who applied last year, to find jobs in an avian conservation breeding project. We are also about to launch a new scheme for the Society's conservation funding programme. Details will be on the website shortly and also in the next magazine.

We still have work to do to make the most of our website, but the Society's presence online has continued to develop, particularly through more content being posted on our facebook page – thanks to everyone who has contributed, and particularly to Chris Kent. The more members who use this facility, the more useful it will become, and the more it will attract the attention of potential members.

I wish you all a successful year aviculturally and otherwise in 2017.

Nigel Hewston

BREEDING BIRDS-OF-PARADISE AT AL WABRA WILDLIFE PRESERVATION (AWWP)

By Rik Dams

Introduction

The family of Birds-of-Paradise Paradisaeidae has 41 species in 14 genera (Gill & Donsker, 2012). The majority of the Bird-of-Paradise species are native to New Guinea while four species occur in Eastern Australia (Frith & Frith 2010).

Birds-of-Paradise are crow-like birds in appearance, the smaller species resemble starlings. Since 1750 the Bird-of-Paradise family has been closely linked to the bowerbird family *Ptilonorhynchidae*. We now know that this view was wrong as anatomy and bio-molecular research has revealed a relationship of the Birds-of-Paradise to Crows, Old world Orioles, Cuckoo-shrikes, Wood-swallows and Butcher birds (Frith & Frith 2010).

Birds-of-Paradise are probably best known because of the extravagant plumage of the males in this sexually dimorphic species. Birds-of-Paradise are frequently used as an example of the principles of sexual selection and female choice. Males have evolved distinct skin, beak or feather colours, elongated feathers and dance or sing to persuade females to mate. In the Birds-of-Paradise these traits have evolved into elaborate display rituals, unique in the animal kingdom.

Aru Island Greater-Bird-of-Paradise displaying

Birds-of-Paradise are mostly confined to dense rainforest habitat. Their diet consists of fruits and to a lesser extent arthropods. The breeding systems are diverse and range from monogamy to lek-type polygamy (Frith & Frith, 2009).

The biology of most Bird-of-Paradise species is still poorly understood due to lack of data. Their habitat in New Guinea is difficult to access and few extensive studies exist. It was only as recently as 2012 that photographic images of live individuals of all species were gathered (Laman & Scholes, 2012).

The Bird-of-Paradise collection of AWWP consists of six different species and one subspecies; Magnificent *Cicinnurus magnificus*, King *Cicinnurus regius*, Twelve-wired *Seleucidis melanoleucus*, Red *Paradisaea rubra*, Lesser *Paradisaea minor*, Mainland Greater *Paradisaea apoda novaeguineae* and Aru Island Greater Bird-of-Paradise *Paradisaea apoda apoda*.

General Husbandry

Housing

Most Bird-of-Paradise species are solitary birds which, as a rule, only come together to mate, therefore each Bird-of-Paradise at AWWP has an individual enclosure. These enclosures have dimensions ranging from 1.8 x 2.5 x 2.2 m (L x W x H) inside and 4.2 x 1.3 x 2.35 m outside for the King Bird-of-Paradise males, up to 2.5 x 3.8 x 2.8 m inside and 10 x 5 x 4 m outside for the Aru Island Greater Birds-of-Paradise. All enclosures have a large planted outside flight covered with shade netting and equipped with a sprinkler system, as well as a smaller temperature controlled inside flight.

Outside flights

The climate of Qatar can be described as a subtropical dry, hot desert climate with low annual rainfall, very high temperatures in summer and a big difference between day and night temperatures. In summer (June to September) daily maximum temperatures can easily reach 40°C or more. During winter, the temperature is cooler and occasional rainfall occurs. Spring and autumn are warm, mostly dry and pleasant, with maximum temperatures between 25°C and 35 °C and cooler night temperatures between 15°C and 22 °C.

During summer the inside flights are cooled to around 27°C. In the outside flights the rain system is automatically operated five times daily for a period of five minutes during summer, three times during spring and autumn and twice during winter. Most of the Birds-of-Paradise do not require any additional heating in winter when nighttime temperatures can drop down to 10 °C. Only the smaller species: Magnificent and King Birds-of Paradise appear to get uncomfortable at these temperatures and are provided with extra heating to keep the ambient inside temperature above 15°C.

The inside flights are usually built from laminated high-density hardboard supported by an aluminium frame which is waterproof and easy to clean. The floor in the inside flight is made out of concrete and is cleaned every other day. Usually just water and a brush are used for cleaning. If, however, the cage is unusually dirty or there are signs

of algae growth on the floor either washing powder or a chloride based detergent is used.

Feeding

Food and water dishes are provided in the inside flight and the birds are fed twice daily according to the schedule shown in Table 1. The average portions differ according to the specific species. Most feeds contain a food item not fed every day, which is therefore called "special".

Day		Regular Feeding Items	Special	Pellet	Vitamin
SAT	AM	Sliced papaya and pears	Grape	Zeigler Pellet	Nekton S
	PM	Sliced papaya and chopped apple	Mazuri Bird gel	Witte Molen Pellet	
SUN	AM	Sliced papaya and pears	Mango	Mazuri Soft-bill Pellet	Grit
	PM	Sliced papaya and chopped apple		T16	
MON	AM	Sliced papaya and pears	Banana	Zeigler Pellet	Tonic-F
	PM	Sliced papaya and chopped apple		Witte Molen Pellet	
TUE	AM	Sliced papaya and pears	Grape	Zeigler Pellet	Grit
	PM	Sliced papaya and chopped apple	Uni Patee	T16	
WED	AM	Sliced papaya and pears	Zophoba	Mazuri Soft-bill Pellet	Nekton MSA
	PM	Sliced papaya and chopped apple		Witte Molen Pellet	
THU	AM	Sliced papaya and pears	Mango	Zeigler Pellet	Grit
	PM	Sliced papaya and chopped apple	Mazuri Bird Gel	T16	
FRI	AM	Sliced papaya and pears	Mixed vegetable	Zeigler Pellet	Calci-lux
	PM	Sliced papaya and chopped apple		Witte Molen Pellet	

Weekly feeding schedule. Moulting birds will get additional Nekton-Bio and Nekton Tonic-I

	Sliced Papaya	Chopped Papaya	Sliced Pear or Apple	Chopped Pear or Apple	Pellet	Special
Greater	± 80 g	/	± 40 g	/	± 40 g	± 8 g
Red, Lesser & Twelve-wired	± 45 g	± 15 g	± 20 g	± 15 g	± 8 g	± 8 g
Magnificent & King	± 25 g	/	± 25 g	/	± 5 g	± 8 g

Average amounts per feeding. Feedings in the afternoon lack the 'special' and are slightly smaller. On Wednesdays the special is either three Zophoba for the Greater Birds-of-Paradise or three to five mealworms for the smaller species. The medium sized birds get the chopped papaya and pear or apple so that the keepers can easily tell the dishes apart, after they have brought them to the birdhouses.

Water dishes get cleaned every morning using dish washing liquid or just water and are disinfected once a week using a 1 in 250 disinfectant dilution.

Breeding

Breeding can occur at any time. Most birds however interrupt their breeding during the hottest part of summer and the coldest part of winter. Outside of these periods the breeding females are given at least one nest platform. All species kept at AWWP build nests for which we provide palm fibre. Most birds add some twigs and leaves they find in the outside enclosures. In general, the Birds-of-Paradise prefer baskets as their nest platform, the King Bird-of-Paradise is an exception and seems to be a cavity breeder, although they do tend to prefer open-fronted boxes over a standard nest box. In AWWP the females are not stimulated to make a nest outside, as the weather in Qatar, during many parts of the year, is unsuitable for incubation and parent rearing.

When a female starts making a nest, she is socialised with a male. King and Twelve-wired Birds-of-Paradise are left together during the day and in most cases even overnight as long as the female has not laid an egg, while the *Paradisaea* species (Red, Lesser, Mainland and Aru Island Greater Birds-of-Paradise) are only socialised under supervision. During recent breeding seasons there have not been any cases of physical aggression by any of these species. Nevertheless, supervision during socialisation is done out of precaution since documentation from previous seasons warns of severe physical aggression even resulting in death. Experience shows that the best time for socialisations is immediately after sunrise. In the *Paradisaea* species we try to bring the female to the male's cage for socialisations, because the males tend to destroy the nest if they find it.

Different birdhouse designs including tunnel systems, doors and windows have been tested in AWWP to socialise males and females, but a classic window in the mesh seems to be the most practical method. The females are conditioned to come to a perch on a moveable perch stand. A plastic cup with drainage holes is attached to the perch. In this cup we put a Zophoba Worm *Zophobas morio*. A whistling mp3 sound is played each time we socialise to provide the female with a sound signal. The perch is placed through the window and by placing the plastic cup with Zophoba Worm to a strategic side, the female is moved back and forwards between cages.

Socialisation perch, female Aru Island Greater Bird-of-Paradise

As soon as the female has laid an egg, she starts incubating and socialisation is stopped. Most of the species at AWWP only lay one egg. Only the King and Red Birds-of-Paradise have clutches up to two, but still they are also separated after the first egg has been laid.

The eggs of the species kept at AWWP all look quite similar. They are oval with a rather pointed small end. The base colour is a pinkish brown and they have red brownish marks. Usually there are more marks near the big end of the egg, but the intensity and the shape of these marks differs greatly between different individuals and eggs.

Bird-of-Paradise eggs, from left to right, 2 King, 2 Lesser and 2 Aru Island. All from different females

Depending on the genetic value of the potential offspring and the parenting abilities of the female, chicks are left in the nest for parent rearing or pulled for hand rearing. Even when the decision has been made to pull the chick, the egg is usually left in the nest up to 14 days. This prevents the female re-laying too quickly. Females which have made a bad nest or have proven to be unreliable incubators are given a dummy egg and the egg is pulled for artificial incubation.

Incubation is done at 37.5°C and a weight loss of 15 % is targeted. The eggs are turned automatically 12 times a day. Chicks usually pip externally 24 hours before the actual hatch. Incubation periods for the different species observed during the 2014 breeding season are shown in Table 3.

	King (21)	Twelve-wired (2)	Lesser (2)	Red (7)	Aru Island Greater (11)	Mainland Greater (5)
Between	16-18 days	19-21 days	17 days	16-18 days	16-19 days	17-18 days
Average	17 days	20 days	17 days	17.57 days	18 days	17.40 days

Incubation periods for the different species during the 2014 breeding season

Parent Rearing

Red and Greater Bird-of-Paradise chicks have been successfully parent-reared in recent years. For the King Bird-of-Paradise chicks we were obliged to pull all the chicks for hand-rearing as they did not gain the necessary weight. Inexperienced females seem to be the major cause, as they tend to feed insufficient amounts of food as well as inedible items. There have not been any attempts in parent rearing the Lesser and Twelve-wired Bird-of-Paradise in recent years.

When parent rearing is attempted, the diet of the female is changed at least two days prior to the suspected hatching day. Instead of sliced food, all food items are chopped and all available fruits are offered every feed. Finely cut pinkie rats are added to the morning food dish while white mealworms and crickets are added to both feeds.

Vitamin supplements (Nekton MSA®) are sprinkled over the pinkie rats and insects. The amount of live food is rationed over the day at intervals to avoid overfeeding.

The females are shut inside for the entire period of parent-rearing in order to prevent them from feeding ants, which are found in the outside enclosures. Historical records show that this has been a lethal problem in the past. The inside enclosure is treated for ants with Demand® 2.5 CS (Syngenta). Besides the risk of the females feeding the ants, the ants can also attack and kill the chicks if they discover the nest.

The parent rearing females are fed live food every two hours from dawn to dusk. The amount and size of the insects are flexible and increase daily;Table 4 can be used as a guideline for Red and Greater Birds-of-Paradise.

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Mealworms	Amount	4	5	6	8	10	15	20-30
	Size	1 cm	1 cm	1 cm	1.5 cm	2 cm	adult	adult
Crickets	Amount	4	4	4	6	6	6	6
	Size	0.5 cm	0.5 cm	0.5 cm	0.5-1 cm	0.5-1 cm	>1 cm	>1 cm
Cut pinkie	Amount	1	1	1	1	1	2	2
Grasshoppers	Amount	/	/	2	3	4	4	4
	Size	/	/	1.5 cm	1.5 cm	2 cm	2 cm	2 cm

Indication of amount and approximate size of insects fed to the Red and Greater Birds-of-Paradise every two hours. The cut pinkie is only supplied once with the morning feeding, to prevent pieces of meat, which attracts ants, being present in the aviaries overnight. After 7 days the maximum amount of live feed used is reached. This amount is offered until about two to three weeks after fledge, after which the portions are gradually decreased.

Parent-reared chicks have been close-ringed without complications at around day seven. Out of precaution the leg ring is taped with brown tape so it is not so obvious.

The age at which the chicks are independent has not yet been determined. A female Red Bird-of-Paradise was recorded to keep on feeding her chicks up until three months after hatch, although the chicks were also taking food from the food dish. At the age of three months these chicks were moved to separate enclosures.

Foster Parenting

A female Mainland Greater Bird-of-Paradise raised an Aru Island Greater Bird-of-Paradise successfully in the 2014 breeding season, the only attempt to foster Bird-of-Paradise chicks under different parents at AWWP. The female accepted the egg, which was much darker and had fewer markings, and reared the chick without any problems.

Hand Rearing

As soon as the eggs are externally pipped, they are moved from the incubator to a hatcher where the temperature is set between 37.0°C and 37.2 °C and the humidity ranges from 60% to 65 %. The eggs are placed in a stainless steel dish lined with paper towelling on which a piece of abrasive washing pad is placed. This material is soft for the bird to lie on, is easy to clean and provides perfect grip which prevents feet problems. Depending on the size of the chick, paper towel lining is used to keep the chick in a good position.

After hatching, the chick is weighed and the umbilicus is disinfected with an iodine gel. Bird-of-Paradise chicks start begging for food within hours after hatching. The chicks are kept hydrated with 5 % glucose and Ringers solution dripped into their beaks hourly. The syringes are kept in an incubator to ensure the fluid does not cool the chicks down. After the chick has passed its first faecal sac, feeding is started gradually.

At AWWP the Bird-of-Paradise chicks are fed a mix of 50 % cut rat pinkies with the gut removed and 50% fresh papaya. To this mix, Nekton MSA and Nekton S vitamin supplements are added generously. Sometimes it is necessary to add a small quantity of water to make a moist mixture. The composition of the food remains the same until the chicks have fledged. Only the size of the pieces increases with the size of the chicks. For the first few days a chopping knife is used to make the pieces as small as possible.

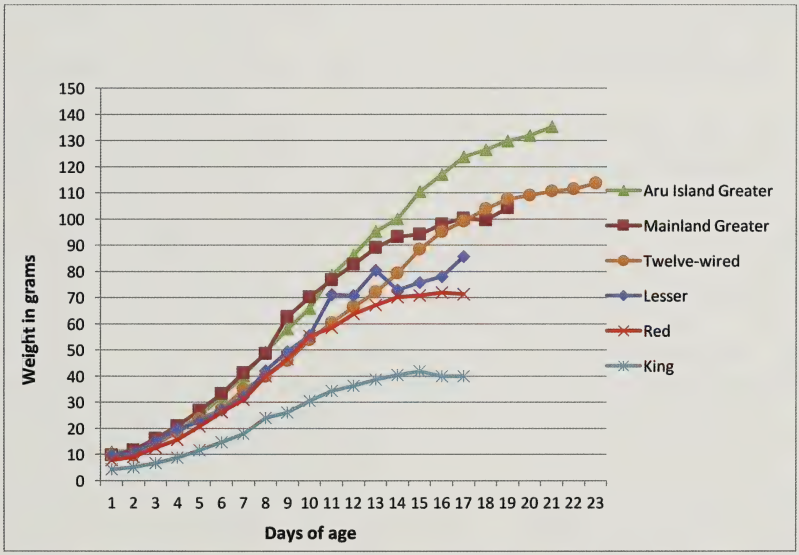
The food mix is prepared for a period of up to 24 hours before feeding and is stored in a fridge. It might be important to note that AWWP breeds its own rats. Frozen pinkies are used only rarely and when they are the food deteriorates much more quickly. It is advisable to make new food as soon as the colour or smell of the mix changes. For every feed we take out little more than the amount we expect to need for the next feed. The food is then fed at room temperature (± 26 °C) using blunt-nosed tweezers.

Chicks at different stages of development

Chicks are fed hourly for the first day from 5 a.m. until 11 p.m. (19 feeds), every one and a half hours for the second day from 5 a.m. until 9.30 p.m. (11 feeds) and two hourly from 5 a.m. until 9 p.m. (9 feeds) from there on. The larger species are moved to three-hourly feeds when their appetite starts to decrease on the two-hourly schedule.

We do not aim to feed a set amount every feed, but watch the bird's behaviour to judge when it has had enough. As soon as it hesitates to beg between mouthfuls, feeding is stopped. It is very important to avoid overfeeding for the first two days. The yolk sac takes a long time to be completely absorbed, sometimes even up to day seven. It is much easier to overfeed than to underfeed. Ideally chicks start begging again after they are placed back into the brooder and if the door is opened again.

The chicks are weighed before the morning feed once a day so we can monitor their development.



Average growth rates for the different species during the 2014 breeding season. Numbers of individuals in brackets. Aru Island Greater (7), Mainland Greater (3), Twelve-wired (2), Lesser (1), Red (5) and King (9). Weighing stops after the chicks are moved to the fledgling cage. Independence is usually achieved within a week after fledging.

After hatching the chicks are moved to a brooder in which the temperature is set at 36.5°C to 36.8 °C and humidity is between 55-60 %. Temperature is lowered gradually throughout the rearing process and is guided by the consistency of the droppings. If the faecal sac is well formed, temperature is kept the same. As soon as the faecal sac starts breaking and the chicks produce wet droppings, the temperature is lowered. It is important to be aware of the fact that there are other possible reasons for the chicks

to start producing broken faecal sacs. Therefore, it is always important to keep an eye on the general behaviour of the chick and if it looks comfortable.

The eyes start to open from day two, but are not functioning until at least five days. From there on the chicks try to take the food from the tweezers instead of just begging for food. From this moment the chicks are fed behind a screen. Birds-of-Paradise are very susceptible to human imprinting. A few hand-reared Birds-of-Paradise at AWWP are imprinted on humans. They have become very aggressive birds, unpleasant to work with and highly unsuitable for breeding purposes.

To prevent human imprinting we have tried to avoid visual contact with humans until they are weaned, by feeding them behind pieces of black cloth which only has an opening for our eyes. Besides this, we have always tried to have another Bird-of-Paradise, preferably the same species, within sight of the chick, especially after they have fledged. None of the birds reared on this method have reached sexual maturity yet, but the behaviour of the weaned chicks is very similar to that of parent-reared chicks, so we are hopeful that the method is sufficient to prevent human imprinting.

The chicks stay in the brooders until they can perch comfortably. After this they are moved to fledging cages in which they are offered perches, food and water dishes. The food dish now contains a variety of fruits (papaya, apple or pear, banana, mango) and soaked pellets. On top of this we offer pieces of pinkie rat which are cut into pieces of about 0.5 to 1 cm^3 depending on the species. Feeding now happens in this fledging cage and no longer in the dish on the scales. Chicks are fed the rat pinkies and are also introduced to the fruits.The rat pinkie is usually the first thing they start taking from the dish independently and is therefore used to convince them to start picking up food. The frequency of feeds is now very flexible and depends on the behaviour of the chick. After a day in the fledgling cage the time between feeds is gradually increased to stimulate self-feeding. Depending on the individual, weaning can take place between two to seven days after fledging, but most of the time, it takes more than five days. In the larger species males tend to fledge at a heavier weight than the females, although the extremes do overlap.

After the chicks are weaned they are transferred to larger inside flights to exercise their flight muscles before they are moved to the birdhouses.

Sexual Maturity

Birds-of-Paradise males take a very long time to obtain their display plumage, up to seven years for the larger species. At AWWP, males that have not completed their display plumage have never been socialised, therefore we do not know whether the males are fertile before their display plumage is complete, although it is thought that juvenile plumaged males may try to mate with females in the wild (Firth & Firth, 2010). Females fledge in their adult plumage and definitely reach sexual maturity way before

seven years of age. A Red Bird-of-Paradise laid her first egg aged three and a Lesser Bird-of-Paradise produced a chick aged four.

Health

Birds-of-Paradise are not particularly prone to any health issues. Nevertheless, caution is taken to not provide them with food items which contain high levels of iron, to prevent iron storage disease.

Faecal samples are screened for parasites monthly and are usually negative. Our Twelve-wired Birds-of-Paradise however appear to be frequent carriers of *Raillietina sp., Capillaria sp.* and coccidia. Despite intensive efforts, including treating them in suspended cages, they continue to test positive periodically. To decrease the risk of re-infection we currently keep most of our Twelve-wired Birds-of-Paradise in concrete-floored aviaries.

Breeding results 2014

Overview

2014 has been a record year for the Birds-of-Paradise at Al Wabra with a total of 34 chicks successfully reared: 11 King, 2 Twelve-wired, 7 Red, 1 Lesser, 5 Mainland Greater and 8 Aru Island Greater Bird-of-Paradise. Of these 7 were parent-reared and the other 27 hand-reared.

The population of Birds-of-Paradise in full adult plumage totals 61 individuals. With the chicks raised this year, the total number of Birds-of-Paradise at Al Wabra for the first time exceeds 100 individuals.

Magnificent	King	Twelve-wired	Red	Lesser	Mainland Greater	Aru Island Greater	Total
1.0.0	11.12.6	8.2.1	9.13.0	3.6.0	5.10.1	14.12.2	118

Birds-of-Paradise population in Al Wabra January 2015

A total of 170 eggs have been laid by the Birds-of-Paradise in 2014. Of these, 58 proved to be fertile, out of which 48 chicks hatched and 34 chicks were alive on the 1st of January 2015. Four fertile eggs laid at the end of December were not evaluated for this breeding season as they did not hatch in 2014.

Species	Eggs	Socialised eggs	Fertile eggs	Hatched	Survived	Fertility rate	Fertility rate of socialised eggs	Hatch rate	Survival rate
King	92	71	28	21	11	30.43	37.68	75	52.38
Twelve-wired	2	2	2	2	2	100	100	100	100
Red	17	12	9	7	7	52.94	75	77.78	100
Lesser	8	5	3	2	1	37,50	75	66.67	50
Mainland	19	12	5	5	5	26.32	41.67	100	100
Aru Island	32	28	11	11	8	34.38	39.29	100	77.78
Total	**170**	**130**	**58**	**48**	**34**	**34.12**	**44.62**	**82.76**	**70.83**

Egg numbers, fertility, hatch and survival rates during the 2014 breeding season. Socialised eggs are defined as eggs laid within three days after socialisation of the female.

As a rule, it is not a big challenge to persuade Bird-of-Paradise females to lay eggs. They do not appear to be very choosy for nest places and in the absence of a suitable nest platform (artificial or natural) females have built nests and laid eggs in the pop hole between the inside and outside flight, or even on the floor.

The biggest challenge in breeding Birds-of-Paradise is the fertilisation of the eggs, which is illustrated by the very low fertility rate. If un-socialised females are excluded, still only 44.62% of the eggs are fertile. Some females were not socialised, occasionally because nest building was not noticed, but mostly because of genetic management. Because of this the total fertility rate is not a very valid parameter, but the fertility rate on socialised eggs is used to evaluate the breeding success.

Many times the females appear to be uninterested in the males while being socialised. Whether this is because the right moment for the female had been missed, or that this particular male does not meet up with the female's expectations is unclear. If a female can see different males from her enclosure, it is possible that she finds the one she is being socialised with less attractive.

King Bird-of-Paradise with 2 fertile eggs

Female	Eggs	Socialised eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A	9	9	4	2	2	44.44	75	66.67
B	16	12	0	0	0	0	/	/
C	6	2	2	1	0	100	50	0
D	12	12	7	6	3	58.33	85.71	50
E	11	11	7	4	4	63.64	57.14	100
F	7	7	5	5	2	71.43	100	40
G	11	0	0	0	0	/	/	/
H	20	18	3	2	0	16.67	66.67	0
Total	**92**	**71**	**28**	**21**	**11**	**39.44**	**75**	**52.38**

Results for the 2014 breeding season

The fact that the fertility rate for King Bird-of-Paradise, which are being left together for multiple days during nest building, is actually lower than the fertility rate for the species which are only being socialised for several hours daily is surprising. At least for this species it excludes the possibility that the right timing has been missed. In this

species all the breeding pairs are housed visually separated, so this also excludes the possibility that the female prefers another male. Mate incompatibility is thought to be the main reason for the low fertility rate.

Females **B** and **H** failed to produce any fertile eggs with respectively 16 and 17 eggs being laid. Both females were reared at Al Wabra, female **B** was hand-reared and female H parent-reared and the males where both wild caught. After switching both males, one female started moulting and the other produced four further eggs of which three proved to be fertile.

Female **G** is over-represented and frequently lays eggs without yolk, she is therefore no longer socialised. As she has successfully parent-reared chicks in the past, it is hoped that she can be used for foster parenting.

In the case of the King Bird-of-Paradise, the situation is further complicated by the fact that the moulting patterns appear to differ strongly between individuals. Unfortunately, records are incomplete and do not allow us to form pairs according to moulting dates. Frequently, males start moulting in the middle of the female's egg laying cycle. Moving of males during the breeding season fortunately is no problem, as long as the male is allowed to settle down for a few days before being socialised.

In Al Wabra, moulting males have never produced fertile eggs but in Weltvogelpark Walsrode in Germany a male King Bird-of-Paradise did successfully fertilise eggs whilst moulting. (J. Dams, pers. comm. 2014)

Hatching rate is poor in this species and this is explained by the fact that the females are generally bad sitters. A total of 19 eggs have been damaged or thrown out of the nest in 2014; 7 were fertile and none of the damaged eggs hatched. Because of this, the protocol for the King Bird-of-Paradise has changed and eggs of bad sitters are now being replaced with dummies and pulled for artificial incubation. The females usually easily accept either infertile or artificial eggs.

The survival rate of the King Bird-of-Paradise for 2014 is too low. Nine hatched chicks did not make it to weaning and this is due to two factors.

Firstly, hand-reared chicks prove to be extremely susceptible to overfeeding. Starting to feed too early and feeding too much is assumed to have caused the death of three chicks. A fourth chick presumably did not lose enough weight during incubation, hatched with an unretracted egg yolk sac and died within hours.

The second factor is the lack of experience in parent-rearing of the females. Three chicks died in the nest or after being pulled from the nest. These chicks were very stunted in growth. Closely monitoring the females showed that they appeared to fail to feed the chicks adequate supplies of live food, even after unlimited amounts were

provided to them. One clutch of parent-reared chicks appeared to be fed well by the female, but were predated by ants *Camponotus xerxes*. Despite preventative spraying with insecticide before hatching, the ants found a way to the nest box and killed and ate half of the chicks within hours.

Despite the low survival rate, 2014 was still an unprecedentedly successful year for the King Bird-of-Paradise. Never before have this many chicks been reared and even more importantly was that three founder males produced chicks for the first time. This was undeniably essential for the population, with only six Al Wabra founder males still being alive on the first of January 2015.

Female	Eggs	Socialised eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A= total	2	2	2	2	2	100%	100%	100%

Results for the 2014 breeding season

This year for the first time since 2009 Twelve-wired Bird-of-Paradise were hatched at Al Wabra. One female hatched at Al Wabra in 2008 produced two eggs resulting in two chicks.

Twelve-wired Bird-of-Paradise seems to be the least aggressive species of Bird-of-Paradise in the Al Wabra collection. Experience in other collections has shown that pairs can be left together without signs of aggression, even when the female is not building nest. This pair is now only separated when the female starts sitting, with no problems to report at the time of writing.

Red Birds-of-Paradise

Female	Eggs	Socialised eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A	8	6	3	3	3	50%	100%	100%
B	6	6	6	4	4	100%	66.67%	100%
C	3	0	0	0	0			
Total	**17**	**12**	**9**	**7**	**7**	**75%**	**77.78%**	**100%**

Results for the 2014 breeding season

Red Bird-of-Paradise have been the most prolific Bird-of-Paradise species at Al Wabra. Females lay eggs eagerly, have clutches of two eggs, fertilisation is high and the chicks appear to be hardier than the other species and have been reared successfully by hand or by the parents.

Because of this, and the fact that there are only two (unrelated) breeding females and one breeding male in the collection, breeding has to be restricted.

This year chicks have been bred from female **B** for the first time and the first two chicks were hand-reared but development was a problem after fledging. During the cleaning of the fledging cage one chick was injured and its clavicle was broken. After bandaging by the veterinary staff, this fracture healed nicely, but when the bandage was removed all the flight feathers appeared to be chewed. At first it was assumed that the bandaging had caused stress and discomfort and that was why the chick started plucking its feathers. But then it was discovered that the chick's sibling had exactly the same problem. All the flight feathers on both the wings and tail where broken and this chick had never been bandaged.

After close examination, it was discovered that they both had severe stress lines on all their flight feathers, and all the feathers seemed to be broken at exactly the same length, so the main hypothesis now is that they must have had a severe stress period during this time of feather development. This might have caused the feathers to be weaker at the point that they broke off.

The reason for these stress lines is however still unclear. The chicks behaved and grew normally during hand-rearing. Although these chicks fledged much lighter than the chicks from female A, a third chick hand-reared from this female fledged at the same weight and did not show stress lines. The only thing different from the other chicks reared this year is that the siblings where kept together in the same cage after fledging. They were only separated when aggression was seen a few days after fledging.

Possibly the presence of another bird in very close proximity after fledging caused the stress. However, parent-rearing of two chicks in one clutch has been successful without any signs of aggression between the chicks. On the contrary, they even appear to seek each other's company more than avoid each other.

Sibling chicks of two-egged clutches are regularly kept in the same incubator up until fledging, without noticeable consequences. After moulting, the feathers fortunately grew back normally in one chick, the other one appears to have only just started moulting at the time of this publication.

Both females were stimulated to parent-rear and female **A** reared a clutch of two chicks to independence. Female **B** also hatched a single chick, but appeared to have abandoned this chick after a nest inspection. The chick was therefore pulled for hand rearing. Female **C** is a bird hatched at Al Wabra in 2011 and produced two clutches: one of two and one of a single egg, but has not been socialised because an unrelated male is not available.

Lesser Birds-of-Paradise

Female	Eggs	Socialised eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A	1	1	1	1	0	100%	100%	0%
B	3	1	0	0	0	0		
C	4	2	2	1	1	100%	50%	100%
Total	**8**	**4**	**3**	**2**	**1**	**75%**	**66.67%**	**50%**

Results for the 2014 breeding season

Lesser Bird-of-Paradise are much less prolific than the Red Bird-of-Paradise. They only lay single egg clutches and produce fewer clutches.

Female **A**, hatched at Al Wabra in 2010, produced a single egg, was socialised for less than five minutes and mating was observed. The egg proved to be fertile and hatched a weak chick. The chick had a poor begging response from the beginning and feedings were increased after poor growth was observed. No clinical reasons were found after thorough health checks. After fledging the situation worsened and as the chick failed to perch independently it was euthanized.

Afterwards it was discovered that this female had accidentally been socialised with her father. This male is a founder, but the severity of influence the inbreeding might have had on the health status of the chick is of course unknown.

Female **B** is a challenging bird to try and breed from. Unlike most birds, her egg-laying behaviour is very unpredictable and she sometimes lays eggs without any previous signs of nest building, or after she has destroyed her nest. Hopefully, careful record keeping will result in being able to predict her breeding behaviour, which in turn will allow us to socialise her successfully.

Female **C** is the most reliable breeding female, but although being a good sitter; one fertile egg was pulled after fourteen days with a very large air chamber. Unfortunately, this could not be corrected and the chick failed to hatch. A second fertile egg fortunately did hatch and was successfully hand-reared.

Mainland Greater Birds-of-Paradise

Female	Eggs	Socialised Eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A	4	4	3	3	3	75%	100%	100%
B	1	0	0	0	0			
C	5	2	2	2	2	100%	100%	100%
D	4	3	0	0	0	0		
E	3	3	0	0	0	0		
F	2	0	0	0	0			
Total	**19**	**11**	**5**	**5**	**5**	**45.45%**	**100%**	**100%**

Results for the 2014 breeding season

Only two females produced fertile eggs in 2014 and this makes sense as they were the females housed directly next to the only male that had produced fertile eggs in former breeding seasons. Female **B** was also socialised with this male, but she only laid one egg which was not fertile. It was a pleasant surprise that later in the season, after the males where swapped, we obtained chicks from the other female as well, also the other male produced his first fertile egg and chick with female **A**.

Unfortunately, the other females have not laid eggs since the move. A problem that often occurs with the Mainland Greater Bird-of-Paradise at Al Wabra is that the nests are destroyed before an egg is laid and this usually results in no egg being laid. Although Mainland Greater Birds-of-Paradise are sometimes socialised for multiple days and overnight, so the male has access to the nest, it sometimes happens that the females destroy their own nest. A possible cause for this behaviour has not yet been determined, the aviaries are large and secluded and therefore disturbance seems unlikely.

Female **A** has successfully raised two chicks during 2014. This female, as one of the female Aru Island Greater Bird-of-Paradise, has the habit of plucking her own feathers on her abdomen and chest during the breeding season. She also plucked these feathers on both her chicks, but after fledging the feathers grew back normally.

Red Bird-of-Paradise at ringing. Notice the piece of tape covering the ring

Aru Island Greater Bird-of-Paradise

Female	Eggs	Socialised eggs	Fertile	Hatched	Survived	Fertility rate of socialised eggs	Hatch rate	Survival rate
A	4	3	0	0	0	0		
B	5	5	3	3	3	60%	100%	100%
C	4	4	4	4	2	100%	100%	50%
D	3	3	0	0	0	0		
E	3	2	0	0	0	0		
F	7	6	2	2	2	33.33%	100%	100%
G	6	5	2	2	1	40%	100%	50%
Total	**32**	**26**	**11**	**11**	**8**	**39.29%**	**100%**	**72.73%**

Results for the 2014 breeding season

Although female **A** produces normal nests and can be socialised normally, she fails to produce fertile eggs. In 2013-2014 she has been socialised with two different males of which one is proven, but never seemed interested. Because she could see more males from this cage, she now has been moved to a different cage where she can only see a single proven male. She has since laid one infertile egg.

Interestingly this male is now excluded from visual contact with other males. It seems

that this male started displaying later in the season and less often than the other males. As Aru Island Greater Birds-of-Paradise are a lekking species, it might be that the males benefit from the competition to reach breeding condition.

Three chicks were lost during this breeding season. One chick from female **C** was being parent-reared and it was only on fledging that a leg malformation was noticed. The femur did not develop properly for unknown reasons. The chick could not perch well and was therefore housed in a wire box until it was weaned. Correctional surgery was then performed successfully, but the chick did not survive the follow-up surgery. A second chick from this female died a few weeks after being transferred from the nursery. No clinical signs were observed and a post mortem did not reveal a possible cause. The third chick, from female G, died from unknown reasons in the fledging cage in the nursery. Again no clinical signs were observed and a post mortem did not show a cause.

Females **D** and **E** are also challenging breeding birds. Female **D** is heavily imprinted, very aggressive and fails to build nests and consequently drops all her eggs from the perch. As she does not build nests, socialisations have not been tried. Because of the imprinting there is little hope of successful socialisation, as she does not show any interest in members of her species. The behaviour of female **E** is very similar to female **B** from the Lesser Bird-of-Paradise. She does not always build nests prior to egg laying, destroys nests and has also dropped eggs from the perch. For this female again, good record keeping will hopefully make her more predictable.

Four eggs have been missed for socialisation because the female was not seen nest building in the outside flight. The Aru Island Greater Bird-of-Paradise are the largest species of Bird-of-Paradise in the Al Wabra collection and the outside flights are large and heavily planted. Because of this, finding the first signs of nest building or even finished nests can be surprisingly difficult.

With eight chicks from four different females, 2014 has been by far the most productive breeding season for the Aru Island Greater Bird-of-Paradise in the history of Al Wabra. Even better news is that some of these chicks originate from two females and four males which had never produced chicks before.

Conclusion

2014 has undoubtedly been the most successful breeding season for Birds-of-Paradise at Al Wabra ever, more than doubling the number of chicks bred in any of the previous years. Nevertheless, the emphasis has definitely not been put on producing high numbers, but rather on breeding from genetically important or unrepresented birds. Productive combinations have therefore been re-paired, or given the chance to parent rear, with good results; nine original birds have bred for the first time and seven chicks have been successfully parent-reared.

Intense monitoring of nest building activities followed by punctual socialisations, moving males which did not successfully fertilise certain females, improved hand and parent-rearing protocols and a portion of good luck are probably accountable for this good breeding season.

Of course challenges still remain; documenting the moulting patterns in King Bird-of-Paradise, experimenting with parent-rearing protocols for this species and improved record keeping on "difficult" females will hopefully further improve breeding results. As long as fertility, hatch and survival rates are not 100%, all protocols are continuously under discussion and room for improvement remains.

References

Firth, C.B. & Firth, D.W. (2009). "Family *Paradisaeidae* (Birds-of-Paradise)". In del Hoyo, Josep; Elliott, Andrew; Christie, David. Handbook of the Birds of the World. Volume 14, Bush-shrikes to Old World Sparrows. Barcelona: Lynx Editions. pp. 404–459.

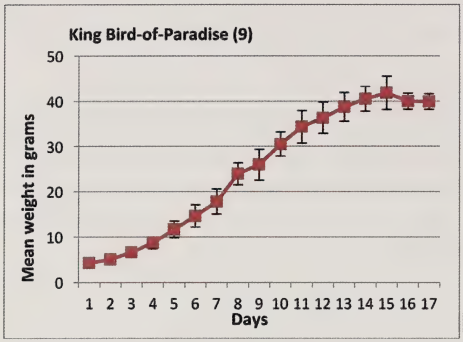
Firth, C.B. & Firth, D.W. (2010). Birds of Paradise, Nature, Art and History. Queensland, Australia: Frith&Frith.

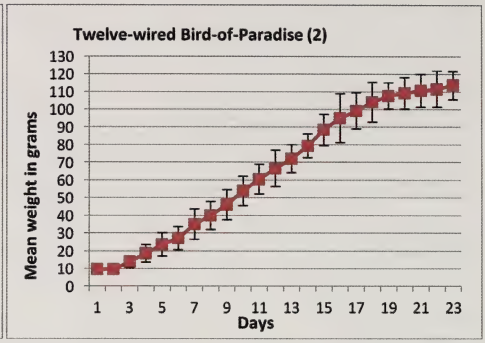
Gill, F & D Donsker (Eds). (2012). IOC World Bird Names (v 3.2). Available at http://www.worldbirdnames.org [Accessed 13 Jan 2013].

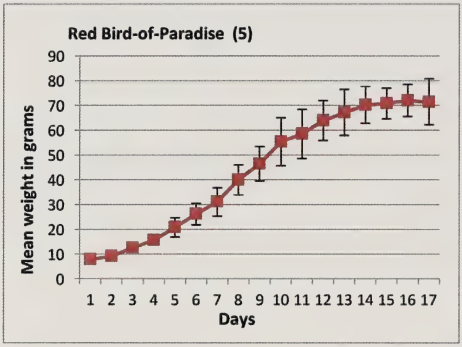
Laman, T. & Scholes, E. (2012). Birds of Paradise. Revealing the World's Most Extraordinary Birds. National Geographic Society.

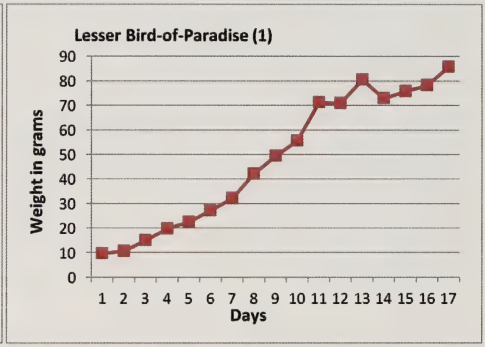
Hand-rearing Weight Graphs

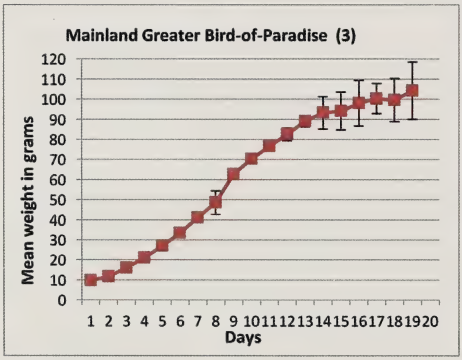
Hand rearing weights for the 2014 breeding season.

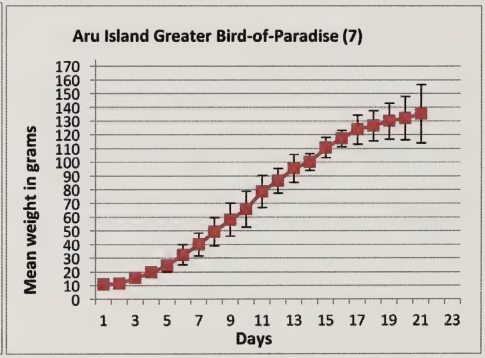












Products mentioned in the text.
Health and Hygiene (Pty) Ltd
- F 10 Hand Gel
- F 10 SC Veterinary disinfectant

P.O. Box 347
Sunninghill, 2157 South Africa
Tel +27 11 474-1668
info@healthandhygiene.co.za

Syngenta
- Demand 2.5 CS

European Regional Centre
Priestley Road, Surrey Research Park
Guildford, Surrey, GU27YH United Kingdom
Tel +44 1483 260000
customer.services@syngenta.com

Versele-Laga
Mazuri, PMI Nutrition International, LLC
- ZuLiFe Bird Gel Diet
- ZuLiFe Soft-Bill Diet Iron Sensitive pellet

P.O. Box 66812
St. Louis, MO 63166 USA
Tel +1 800-227-8941
info@mazuri.com

NEKTON GmbH
- Nekton Bio
- Nekton MSA
- Nekton S
- Nekton Tonic F
- Nekton Tonic I

Kieselbronnerstr. 28
Pforzheim, D-75177 Germany
Tel +49 7231 / 95 46 0
info@nekton.de

- Calci-lux
- Grit with coral
- Orlux Uni pate
-T 16 original softbill pellet

Kapellestraat 70
Deinze, 9800 Belgium
Tel +32 93813200
info@verla.be

Witte molen
- Mynah Granulates (plus)

Postbus 48
Wijk en Aalburg, 4260 AA Netherlands
Tel +31 416 358300
info@wittemolen.nl

Tel +1 717-677-6181
info@zeiglerfeed.com

Text and photos by Rik Dams, edited by Simon Matthews, Esmari Rowan-Harrod and Dr. Cromwell Purchase. Protocols in this document have been implemented at AWWP under the supervision of Simon Matthews, Curator of Birds.

EAST AFRICAN CROWNED CRANES

By Tom Blaas
tomblaas@web.de

East African Crowned Cranes *Balearica regulorum*, also known as South African Grey Crowned Crane, are native to Southern and Eastern Africa. They are spread from Angola to Botswana and other countries like Kenya, Mozambique, Swaziland, Tanzania and Uganda. There are actually two subspecies of the Grey Crowned Crane: in the Northern part of their native areas lives the subspecies *B. r. gibbericeps*, whereas in the Southern part of the area is home to *B. r. regulorum*.

Grey Crowned Crane

Unfortunately, there has been a reduction in their population which currently is estimated to be 60,000 individuals. In 2009, the East African Crowned Cranes were first considered to be vulnerable and later as endangered in 2012. The reason for the decrease in their population is due to the loss of habitat. To breed successfully, the cranes require wetlands, but draining, overgrazing with cattle has made those wetlands disappear. Also pesticides and hunting these birds are more reasons for their decline. The Crowned Cranes are shot, captured and sold and their eggs are also collected for different reasons. Since they may also search for food on the farmers' fields, they are often chased away by them. Unfortunately, the farmers do not understand that the Crowned Cranes eat a lot of insects such as grasshoppers and also small vertebrates,

for example mice and rats that are actual threatening their crops. It is at last being realized how much good they do as well as being a tourist attraction. The Crowned Cranes have got a special method of flushing their prey, they stamp on the ground to make them escape then they can easily spot them, catching them is no problem.

The trading of this species on the international level is ruled by CITES, Appendix II. They are widely spread over European zoos. In Germany, one of my two home countries, they have been bred in Leipzig and Dresden, both situated in Saxony, but also in the famous bird park at Walsrode. Also in Marlow in Northern Germany. In my second home country Italy, they are to be seen in the Parco Natura Viva. Nowadays, in contrast to just some months ago, they are reared more and more often by private breeders and also by some farms such as by the French breeding centre, Ferme de Beaumont which is situated about 80 km from Rouen.

When it comes to acquiring this species, we should consider that it requires lots of bushes but also grassland and an opportunity to bathe, this means having a pond which needs to be stable. They also need a shelter which provides warmth during the winter months. In winter they can be allowed to range freely as long as the temperature is around 5°C or warmer. As soon as the temperatures go back to 0°C or colder, you need to make sure that the cranes are inside their shelter which needs to be heated.

Crowned Cranes are represented by two species, the South African Grey that this article is about and two subspecies. These are the North African Black Crowned Crane *Balearica pavonina cecilae* and the West African Black Crowned Crane *Balearica pavonina pavonina*. The North African Black has obtained its name due to the crown of feathers on their head which is an intense straw yellow. In contrast to the West African Crowned Cranes, they have a slate grey upper body with a light grey neck and breast also more white than red featherless cheeks with red wattles that can be inflated during display. They have red brown secondaries and black primaries as well as light yellow and white feathers covering the wing feathers and black, spiky feathers on the head. They can be easily told from the West African Crowned Cranes which have black plumage on the neck, head and breast and more red than white cheeks. However, all Crowned Cranes have got the characteristic crowns on their heads. The powerful beak, which is relatively short and a dark grey colour appears compressed on the sides. The feet are grey and their long neck has 19 cervical vertebrae. These birds have light blue eyes. They can reach a height of 1.05 m, a length of 1 m, a wingspan of 1.80 m and can weigh up to 5 kg.

The difference between them and the other cranes is that the Crowned Cranes have shorter windpipes than the cranes of the genus Grus, which in the Crowned Cranes does not reach to the sternum. If you want to successfully breed cranes, try to get some young, fully grown birds of the current year as this will ease their adaption to the new home. Furthermore, you can get them a new partner if they do not bond well and/or if they are too closely related. They cannot be sexed reliably by sight. Usually

the males are larger than the females but there are exceptions. The most reliable method is by DNA. This can be done by removing a blood feather or taking a blood sample. I have watched the growing young Crowned Cranes at Dresden Zoo and I can confirm that they (hatched in August 2015) grow quickly and so difference concerning the height is not a reliable guide to sex because this can change from day to day. Breeders who claim that they were able to tell the males from the females because of the different behaviour and the height can be right, but there is no guarantee. Not even their call, which is a loud 'hau hau hau' (which can upset intolerant neighbours if you keep more than one pair, and the cranes do make these sounds from an age of one and a half to 2 years). A guaranteed sexed pair would be the best to obtain.

Fortunately, pinioning the birds is forbidden in some European countries. Occasionally it is said that pinioned birds cannot balance when mating, particularly the males. Obviously you cannot expect offspring in such a case. Furthermore, there is an increased risk that the bird can injure the wing at the point of pinioning in a stressful situation. Clipping the primary feathers of one wing is another method of preventing flight but care must be taken when the birds are moulting as wing feathers grow quickly and they are soon able to fly again, especially in a strong wind. Feathers shouldn't be cut when growing as they will bleed profusely. The best solution is to keep the birds in an aviary with a netting roof.

The birds should be allowed to get to know you, but you need to be patient otherwise they will try to escape as soon as you enter the aviary. On the other hand, you should never try to imprint the birds as this could have extremely negative consequences with socialization and they will cause problems with finding a mate. In the worst case, you will be attacked by them (although I have never heard this concerning the Crowned Cranes).

Acquiring young, freshly hatched cranes should be avoided and rearing left to the experts. It is taken for granted not to purchase any sick birds. Any sign of disease or poor plumage and they should be avoided. Only purchase birds from a reliable breeder or dealer, some birds could be a danger to other species in your collection. If the cranes don't know each other, it may be necessary to separate them, keeping a fence between them so that they can get used to each other and then introduce them, but being prepared to separate them again if necessary. A good sign that they are ready to be introduced is when they stand side by side at the fence and call. It is generally recommended to put the male into the female's part of the aviary, not the other way around.

To avoid jealousy, you should provide them with enough food and water placed in 2 or 3 different points. It can take a while until the Crowned Cranes become a bonded pair and once again it needs to be said that you need to be patient. Although it may not happen that often, but it can be that the cranes in the first days, weeks, months or even years live in harmony and then suddenly begin to attack each other. So, you need to be

careful and give them some areas to hide in, like bushes, shrubs and trees.

Since the 4th toe is well developed and is positioned high on the foot, the Crowned Cranes can fly up trees where they love to roost during the night; other species of crane cannot sit on trees branches because their feet are not built in a way that would enable them to perch.

If the couple lives together in harmony, you may witness their mating dances. This consists of bowing and extending their wings, and they repeat this ceremony to strengthen the pair bond. Crowned Cranes reach maturity when they are aged 4 to 6 years. The females can lay eggs from June to September and can lay several clutches if they don't start to incubate the eggs.

After mating, the female will lay 2 to 4 white, or sometimes cream coloured eggs, and it will take 29 to 31 days to hatch them. Both of the pair will incubate. As a nesting material you can offer some straw.

Crowned Cranes rearing chicks

Both parents rear and care for their offspring, and although they may soon explore the entire aviary, the parents are always near them and they also give them some food from their beaks. They also show them where to bathe. So you always need offer them water to drink and to bathe in! However, the newly hatched crane chicks and also those that are a few days old must not get into too deep water containers from which they cannot escape since this would sentence them to death. The crane chicks

can be offered some ceramic trays about 10 cm deep that are also quite easy to clean. When they are about 60 cm or larger, you can offer them plastic tubs and shower trays. When the Crowned Cranes are 6 weeks old they can be fed with the same food that you give to the adults. It is recommended to give them a mixture consisting of 40% of withdrawal feed for turkeys, 35% wheat, 10% food for waterfowl from the company Lundi, also 5% dried shrimp, 5% crane croquettes from Michael Hassel (www.hassel-gmbh.de) and some trout pellets. You may also give some food produced by Teurlings (www.teurlings.nl), they sell live food which is used for waterfowl. The breeding pair should be given fish such as Smelt *Osmerus eperlanus*, but also frozen mice, shrimps and mealworms once or twice a week. While the female is laying you need to give her some pellets with 17 % protein that stimulates her to lay eggs. You can also give them some fruit such as apples, pears, but also berries. You will soon realize what they like to eat, on the other hand if they do not eat what is appropriate for them you will need a while to convince them! The newly hatched and juvenile Crowned Cranes should be given a hard cooked egg mixture with turkey starter which you can dampen a little bit. You need to give the food, as well as the water, in flower-pot saucers. Place some small pebbles into the water dish to prevent slipping and accidental drowning.

It can be assumed that Crowned Cranes will be bred more and more often. They were always one of the few crane species which was relatively widely spread across the bird parks and zoos. Thanks to this, it is now possible to exchange some individuals for breeding, which is of course necessary to avoid inbreeding. If you treat them correctly, they can live up to 50 years. Should you now desire to acquire a pair of *Balearica regulorum* then you should build an aviary with an appropriate shelter, in total measuring 200 m2. The cranes live in pairs and their offspring grow quite fast. When the breeding season is over they may also be kept in mixed aviaries, for example together with waterfowl. If you want to obtain them I recommend websites such as the different Aviornis sections, WPA sections of the Ferme de Beaumont, Amatori Italiani Fagiani e Acquatici Ornamentali.

* * *

COUNCIL CHANGES

A warm welcome to new council members Chris Green and Gary Ward who were elected at the recent AGM. Chris is a Senior Birdkeeper at Cotswold Wildlife Park, and has taken over organising our overseas trips from Mike Curzon. Gary is Head Birdkeeper at Newquay Zoo. Both also have their own bird collections, and have been very active in promoting the Society. We are delighted to announce that Laura Gardner was elected as Vice-President in recognition of her great contribution to the Society over many years on Council.

KIRKLAND'S WARBLER *Setophaga kirtlandii*

Bushfires take their toll on many species, destroying habitat and laying bare land for years but it has been found in America that this is necessary for the survival of the endangered Kirkland's Warbler. The Jack Pine forests are the only place they breed. They need trees that are between 1.5 and 5 metres tall. The warblers nest on the ground beneath the branches and if the pines become too tall or dense then they can't breed. Areas are now managed, not by fire but selective clearance to allow new plants to grow, creating suitable habitats that appear to be stabilising the declining population.

* * *

ELEANORA'S FALCONS *Falco eleonorae* **CACHE THEIR PREY**

Many bird, such as Corvids, Butcherbirds and Shrikes are known to store their food for later consumption, but research in Morocco has shown that Eleanora's Falcons have taken it a step further. Because of the heat which would dry out prey very quickly they have taken to caching food in nooks and crannies to keep it alive for a day or two until it can be retrieved and fed to their chicks as fresh food. This method maximises the abundance of migrating passerines.

* * *

ORIENTAL WHITE-BACKED VULTURE *Gyps bengalensis* **BREEDING**

Good news from the Vulture Breeding Centre at Changa Manga, near Lahore in Pakistan is the hatching of two critically endangered Oriental White-backed Vultures. Both are being parent reared and seem to be doing well. This success is the result of many years work and it is hoped that further breeding will take place as more pairs become mature. Pakistan holds a small, but growing, population of this once common species.

* * *

EXTREMELY RARE BLUE-EYED GROUND DOVE *Columbina cyanopis* **REDISCOVERED IN BRAZIL AFTER A GAP OF 75 YEARS**

The blue eyes of an extremely rare bird hadn't been seen for nearly a century. In one of the most extraordinary stories in Brazilian conservation, a group of researchers have announced the comeback of the Blue-eyed Ground Dove. Last documented in 1941, it was believed extinct. But now the species has been found at top-secret locations in the Brazilian state of Minas Gerais. However, researchers can only confirm sightings of 12 individuals, so securing its habitat will be the key to conserving this elusive bird.

CONTENTS

Published by the Avicultural Society, England